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Research Article

Dentipellicula hainanensis (Hericiaceae, Agaricomycetes) and *Phylloporia rigida* (Hymenochaetaceae, Agaricomycetes), two new species of wood-inhabiting fungi from Hainan Province, South China

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Abstract

Wood-rotting fungi, which are essential constituents of forest ecosystems, act as critical mediators of organic matter decomposition and material recycling within such systems. During the investigation of wood-inhabiting fungi in Hainan, China, a large number of specimens were collected. Two new species are described, based on phylogeny, morphology, host and geographic distribution. *Dentipellicula hainanensis* **sp. nov.** is characterised by resupinate, soft corky and tomentose basidiomata, uneven pileal surface and ellipsoid basidiospores (2.8–)3–4.7(–5.2) × 3.2–4.2(–4.4) µm. *Phylloporia rigida* **sp. nov.** is characterised by tough, fawn to reddish-brown basidiomata and ellipsoid basidiospores 2.3–4.5 × 2.2–3.8 µm. Detailed illustrations and descriptions of the novel species are provided. Phylogenetic analyses inferred from the combined ITS + nLSU datasets confirmed that the two new species are distinct within *Dentipellicula* and *Phylloporia*.

Key words: Macrofungi, morphology, phylogeny, taxonomy

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Introduction

China harbours high diversity of wood-inhabiting fungi, with more than 1700 species documented to date (Dai 2010, 2012; Cui et al. 2019; Wu et al. 2022a, b; Liu et al. 2023; Yuan et al. 2023), the majority of which are distributed in south-western China (Wu et al. 2022b).

Dentipellicula Y.C. Dai & L.W. Zhou, a genus of Hericiaceae Donk, Russulales Kreisel ex P.M. Kirk, P.F. Cannon & J.C. David, is a kind of hydnoid fungi. It was established by Zhou and Dai (2013) and typified by *Dentipellicula taiwaniana* (Sheng H. Wu) Y.C. Dai & L.W. Zhou. *Dentipellicula* is characterised by hydnoid, resupinate basidiocarps with soft spines, a monomitic hyphal system with clamp connections and cyanophilous hyphae; and rough amyloid basidiospores (Ginns 1986; Zhou and Dai 2013; Chen et al. 2015; Zhou et al. 2021).

Dentipellicula was originally a member of *Dentipellis*. Zhou and Dai (2013) conducted a study of wood-inhabiting hydnoid species in Russulales and found that *Dentipellis taiwaniana* and *D. leptodon* (Mont.) Y.C. Dai & L.W. Zhou separated from *Dentipellis*, but phylogenetically clustered with *Wrightoporia* Pouzar. Morphologically, different from *Dentipellis* species, the generative hyphae

of *D. taiwaniana* and *D. leptodon* showed a cyanophilic reaction. Meanwhile, the two species differ from *Wrightoporia* by their hydnoid hymenium and monomitic hyphal structure. Therefore, they argued that these two species did not belong to *Dentipellis* and *Wrightoporia* and established a new genus *Dentipellicula*. Subsequently, Chen et al. (2015) described *Dentipellicula austroafricana* Jia J. Chen, L.L. Shen & Y.C. Dai from South Africa, based on morphological characters and molecular data. Zhou et al. (2021) described *Dentipellicula guyanensis* Yuan Yuan, Meng Zhou, Jia J. Chen & Vlasák, based on morphological characters and ITS and nLSU sequences data from French Guiana. To date, the genus *Dentipellicula* comprises four recognised species, *D. austroafricana*, *D. guyanensis*, *D. leptodon* and *D. taiwaniana*.

The genus *Phylloporia* Murrill belongs to Hymenochaetaceae, Hymenochaetales, typified by *P. parasitica* Murrill, which was initially described from South America (Colombia) and grows on *Bignonia* sp. (Murrill 1904). *Phylloporia* species are characterised by annual or perennial, soft corky to hard corky basidiomata, tomentose to velutinate pileal surface, generative hyphae with simple septa and subglobose, ellipsoid or cylindrical, hyaline to yellowish, fairly thick-walled basidiospores. *Phylloporia* species are widely distributed in the Tropics and mostly parasitise living angiosperm trees, causing white rot (Wu et al. 2022b; Zhou et al. 2022).

With the development of molecular systematics, a series of phylogenetic studies on *Phylloporia* have emerged in recent years. Wagner and Ryvarden (2002) conducted the first monographic revision of this genus, incorporating phylogenetic data and ultimately confirmed 12 species within the genus. Olou et al. (2021) described a new species and a new record species from Benin, based on morphological characters and molecular data. Zhou et al. (2022) described two new species from the Neotropics, based on 28S ribosomal RNA phylogeny, morphology, host and geographic distribution. Subsequently, Olou et al. (2023) discovered and described a new species *Phylloporia* in Benin. Jerusalem et al. (2025) conducted a comprehensive multigene phylogeny of *Phylloporia* and described six new species from tropical Africa. To date, approximately 84 species have been recognised in *Phylloporia* worldwide, with 37 species reported from China (Wu et al. 2019a, 2020; Chamorro-Martínez et al. 2022; Zhou et al. 2022; Castro Hernández et al. 2023; Olou et al. 2023; Jerusalem et al. 2025; Shao et al. 2025).

Wood-inhabiting fungi are a morphologically, phylogenetically and ecologically diverse group, playing an integral role in wood degradation and the matter cycle within the ecological system and recognised as pivotal contributors to the intricate balance of forest ecosystems, these fungi being renowned as “key players” due to their enzymatic prowess, effectively breaking down woody components like lignin, cellulose and hemicellulose (Larsson et al. 2006; Dai et al. 2015; Dong et al. 2024, 2025; Yang et al. 2025). During our investigations of macrofungi from Hainan Province, three specimens of *Dentipellicula* and two of *Phylloporia*, exhibiting distinct morphological characteristics, were collected. The morphological observations and phylogenetic analyses, based on ITS + nLSU combined matrices were conducted to confirm the affinity of the undescribed species corresponding to *Dentipellicula* and *Phylloporia*. Accordingly, two new species are formally described and illustrated in the present study.

Materials and methods

Morphological studies

Specimen collection and preservation followed the methods described by Song et al. (2025). The specimens used in this study were gathered during the annual growing season of macrofungi (June to October). The specimens were dried on-site using a portable oven, to prevent putrefaction and contamination; the drying temperature was controlled at 40 °C–45 °C and the process was continued until the specimens were completely desiccated. Macromorphological descriptions were based on field notes and herbarium specimens. Detailed specimen information, such as host trees, ecological habits, geographic coordinates, location, altitude, collector and date, was recorded (Rathnayaka et al. 2025). Meanwhile, photos of the fruiting bodies and growth environment were taken by iPhone 15 Pro Max. All samples examined in this study were deposited in the Fungarium of the College of Life Sciences, Liaocheng University (LCUF). Micro-morphological data were obtained from dried specimens and observed under an Olympus BX53 compound microscope following the methods of Song et al. (2022). Basidiospores were measured from sections cut from the spines. The following abbreviations were used: IKI = Melzer's reagent, IKI– = negative in Melzer's reagent, KOH = 5% potassium hydroxide, CB = Cotton Blue, CB+ = cyanophilous, CB– = acyanophilous, L = mean spore length (arithmetic average of all spores), W = mean spore width (arithmetic average of all spores), Q = variation in the L/W ratios between the specimens studied and n = number of spores measured from a given number of specimens. All new fungal taxa described in this study have been formally registered in MycoBank (https://www.mycobank.org/) and the corresponding MycoBank registration numbers are provided in the taxonomic treatment section of the main text.

Molecular study

The CTAB plant genome rapid extraction Hi-DNA-secure Plant Kit (Tiangen, Beijing, China) was used to extract total genomic DNA from dried herbarium specimens. The extracted DNA was used to perform the polymerase chain reaction (PCR) according to the manufacturer's instructions with some modifications (Li et al. 2023; Song et al. 2025). The primer pairs, ITS5/ITS4 and LR0R/LR7, were used to amplify ITS and nLSU sequences (Song et al. 2022, 2023). The PCR process for ITS was as follows: initial denaturation at 95 °C for 3 min, followed by 35 cycles at 94 °C for 40 s, 56 °C for 45 s and 72 °C for 1 min and a final extension of 72 °C for 10 min. The PCR process for nLSU was as follows: initial denaturation at 94 °C for 1 min, followed by 35 cycles at 94 °C for 30 s, 50 °C for 1 min and 72 °C for 1.5 min and a final extension of 72 °C for 10 min. The PCR products were purified and sequenced at Beijing Genomics Institute, China, with the same primers. All newly-generated sequences were submitted to GenBank (Table 1). Other sequences in the dataset for phylogenetic analysis were downloaded from GenBank.

Phylogenetic analyses

The phylogenetic relationships of *Dentipellicula* and *Phylloporia* were inferred, based on the combined ITS + nLSU sequence datasets. The datasets were aligned in MAFFT 7 (Katoh and Standley 2013) and manually adjusted in BioEdit (Hall 1999).

Table 1. A list of species, specimens and GenBank accession numbers of sequences used in this study.

Species	Specimen no.	Locality	GenBank accession no.		Reference
			ITS	nLSU	
Bondarzewia montana	DAOM F-415	Canada	DQ 200923	DQ 234539	Chen et al. (2015)
Bondarzewia podocarpi	Dai 9261	China	KJ 583207	KJ 583221	Chen et al. (2015)
Dentipellicula austroafricana	Dai 12580	South Africa	KJ 855274	KJ 855275	Chen et al. (2015)
Dentipellicula guyanensis	JV1808/35	Uganda	MN547359	MN547358	Zhou et al. (2021)
Dentipellicula hainanensis	MHN240385	China	**PX612029**	**PX494252**	This study
Dentipellicula hainanensis	MHN240401	China	**PX612030**	**PX494253**	This study
Dentipellicula hainanensis	MHN250010	China	**PX612031**	-	This study
Dentipellicula leptodon	GB 011123	China	EU 118625	EU 118625	Chen et al. (2015)
Dentipellicula taiwaniana	Cui 8346	China	JQ 349114	JQ 349100	Chen et al. (2015)
Dentipellicula taiwaniana	Dai 10867	China	JQ 349115	JQ 349101	Chen et al. (2015)
Dentipellicula taiwaniana	Dai 13709	China	MH 085941	MH 085957	Wang (2018)
Dentipellicula taiwaniana	MHN240350	China	**PX612032**	**PX494254**	This study
Dentipellis tropicalis	Cui 8545	China	KR 108236	KR 108240	Zhou et al. (2021)
Dentipellis tropicalis	He 1993	China	KR 108237	KR 108241	Zhou et al. (2021)
Dentipellopsis dacrydicola	Dai 12004	China	JQ 349104	JQ 349089	Zhou et al. (2021)
Dentipellopsis dacrydicola	Dai 12010	China	-	JQ 349090	Zhou et al. (2021)
Fomitiporella resupinata	DMC 476	Cameroon	KJ787822	JF712935	Zhou and Dai (2012)
Fomitiporella sinica	LWZ 20130809-5	China	KJ787819	KJ787810	Zhou (2014)
Fomitiporella tenuissima	Dai 12245	China	KC456242	KC999902	Yu et al. (2013)
Fomitiporella umbrinella	JV 0509/114	USA	KX181314	KX181336	Ji et al. (2017)
Fulvifomes fastuosus	CBS 213.36	Philippines	AY558615	AY059057	Wagner and Fischer (2002)
Fulvifomes robiniae	CFMR 2693	USA	KX065961	KX065995	Sayers et al. (2020)
Fulvifomes yoroui	OAB0097	Benin	MN017126	MN017120	Olou et al. (2019)
Hericium coralloides	Cui 14825	China	MH 085948	MH 085962	Wang (2018)
Hericium coralloides	Cui 14826	China	MH 085949	MH 085963	Wang (2018)
Inonotus andersonii	JV1209_66	USA	MN318443	MN318443	Olou et al. (2023)
Inonotus hispidus	92-829	Germany	AY624993	AF311014	Olou et al. (2023)
Laxitextum bicolor	NH 5166	Sweden	AF 310102	AF 310102	Zhou et al. (2021)
Phylloporia afropectinata	KE 16 107	Kenya	-	KY349147	Yombiyeni and Decock (2017)
Phylloporia afropectinata	MUCL 58359	Kenya	-	KY349148	Yombiyeni and Decock (2017)
Phylloporia afrospathulata	MUCL 54511	Gabon	-	KJ743248	Yombiyeni et al. (2015)
Phylloporia afrospathulata	MUCL 53983	Gabon	-	KJ743249	Yombiyeni et al. (2015)
Phylloporia alyxiae	Chen 1182	China	-	LC514407	Wu et al. (2020)
Phylloporia alyxiae	GC 1604-28	China	-	LC514408	Wu et al. (2020)
Phylloporia atlantica	JRF142	Brazil	-	MG738813	Wu et al. (2019a)
Phylloporia atlantica	JRF151	Brazil	-	MG738814	Wu et al. (2019a)
Phylloporia beninensis	OAB0142	Brazil	MW244094	MW244099	Olou et al. (2021)
Phylloporia beninensis	OAB0511	Benin	-	MW244096	Olou et al. (2021)
Phylloporia bibulosa	Ahmad27088	Pakistan	-	AF411824	Wagner and Ryvarden (2002)
Phylloporia boldo	CIEFAPcc532	Chile	-	MK193759	Rajchenberg et al. (2019)
Phylloporia boldo	CIEFAPcc584	Chile	-	MK193758	Rajchenberg et al. (2019)
Phylloporia capucina	Robledo1610	Argentina	-	KJ651919	Sayers et al. (2020)
Phylloporia chrysites	MUCL 52862	Mexico	-	HM635667	Valenzuela et al. (2011)
Phylloporia chrysites	MUCL 52764	Mexico	-	HM635666	Valenzuela et al. (2011)
Phylloporia clariceae	FLOR:51258	Brazil	-	KJ631406	Ferreira-Lopes et al. (2016)
Phylloporia clausenae	Yuan 3528	China	-	KJ787795	Zhou (2015a)
Phylloporia clausenae	Cui 8463	China	MH151186	MH165868	Zhou (2015a)
Phylloporia crataegi	Dai 18133	China	MH151191	MH165865	Zhou and Dai (2012)
Phylloporia crataegi	Dai 11016	China	-	JF712923	Zhou and Dai (2012)
Phylloporia cryptolepidis	GXU3569	China	OQ146995	PQ395417	Shao et al. (2025)
Phylloporia cryptolepidis	GXU3610	China	PQ057061	PQ063259	Shao et al. (2025)
Phylloporia crystallina	JV2106/102	Ecuador	-	ON006467	Zhou et al. (2022)
Phylloporia cylindrispora	Yuan 6144	China	-	KJ787798	Zhou (2015a)

Species	Specimen no.	Locality	GenBank accession no.		Reference
			ITS	nLSU	
Phylloporia cylindrispora	Yuan 6148	China	-	KJ787797	Zhou (2015a)
Phylloporia cystidiolophora	Dai 13953	China	-	MG738799	Wu et al. (2019a)
Phylloporia cystidiolophora	Dai 13945	China	-	MG738798	Wu et al. (2019a)
Phylloporia dependens	Cui 13763	China	MH151190	KX242353	Chen et al. (2017)
Phylloporia elegans	FLOR:51179	Brazil	-	KJ631409	Ferreira-Lopes et al. (2016)
Phylloporia elegans	FLOR:51178	Brazil	-	KJ631408	Ferreira-Lopes et al. (2016)
Phylloporia ephedrae	TAA 72-2	Turkmenistan	MH151184	AF411826	Wagner and Ryvarden (2002)
Phylloporia flabelliforma	MUCL 55570	Gabon	NR_154332	KU198350	Decock et al. (2015)
Phylloporia flabelliforma	MUCL 55569	Gabon	KU198356	KU198349	Decock et al. (2015)
Phylloporia flacourtiae	Yuan 6362	China	-	KJ787801	Zhou (2015a)
Phylloporia flacourtiae	Yuan 6360	China	-	KJ787800	Zhou (2015a)
Phylloporia fontanesiae	Cui 12356	China	MH151188	MH165871	Zhou and Dai (2012)
Phylloporia fontanesiae	Li 199	China	-	JF712925	Zhou and Dai (2012)
Phylloporia fruticum	MUCL 52762	Mexico	-	HM635668	Valenzuela et al. (2011)
Phylloporia fruticum	ENCB TR&RV858	Mexico	-	HM635669	Valenzuela et al. (2011)
Phylloporia fulva	MUCL 54472	Gabon	-	KJ743247	Yombiyeni et al. (2015)
Phylloporia gabonensis	MUCL 55572	Gabon	KU198354	KU198352	Yombiyeni et al. (2015)
Phylloporia gabonensis	MUCL 55571	Gabon	NR_154331	KU198353	Yombiyeni et al. (2015)
Phylloporia gutta	Dai 16070	China	MH151183	MH165863	Zhou and Dai (2012)
Phylloporia gutta	Dai 4197	China	-	JF712927	Zhou and Dai (2012)
Phylloporia hainaniana	Dai 9460	China	-	JF712928	Cui et al. (2010)
Phylloporia homocarnica	Yuan 5766	China	-	KJ787804	Zhou (2015a)
Phylloporia homocarnica	Yuan 5750	China	MH151195	KJ787803	Zhou (2015a)
Phylloporia inonotoides	MUCL 54468	China	-	KJ743250	Yombiyeni et al. (2015)
Phylloporia lespedezae	Dai 17065	China	MH151179	KY242602	Ren and Wu (2017)
Phylloporia lespedezae	Dai 17067	China	MH151180	KY242603	Ren and Wu (2017)
Phylloporia littoralis	MUCL: 56144	Gabon	-	KY349140	Yombiyeni and Decock (2017)
Phylloporia littoralis	OAB0204	Benin	MW244095	MW244098	Olou et al. (2021)
Phylloporia lonicerae	Dai 17900	China	MH151175	MG738802	Qin et al. (2018)
Phylloporia lonicerae	Dai 17899	China	MH151174	MG738801	Qin et al. (2018)
Phylloporia manglietiae	Cui 13709	China	MF410324	KX242358	Chen et al. (2017)
Phylloporia memecyli	CD-GA12-812	Gabon	-	KJ743281	Yombiyeni et al. (2015)
Phylloporia memecyli	MJ-GA19-091	Gabon	-	PP851484	Jerusalem et al. (2025)
Phylloporia microspora	LR 26485	Zimbabwe	-	PP851486	Jerusalem et al. (2025)
Phylloporia minima	MUCL 43132	Australia	-	PP851487	Wu et al. (2022b)
Phylloporia minuta	FURB 55088	Brazil	-	NG_064479	Bittencourt et al. (2018)
Phylloporia minutipora	Dai 16172	China	-	MH165873	Zhou (2016)
Phylloporia minutipora	LWZ-2016	China	-	KU904464	Sayers et al. (2020)
Phylloporia minutipora	Dai 9257	China	-	KU904464	Sayers et al. (2020)
Phylloporia minutispora	Ipulet 706	Uganda	-	JF712929	Ipulet and Ryvarden (2005)
Phylloporia minutispora	MUCL 52865	Congo	-	HM635671	Valenzuela et al. (2011)
Phylloporia miomboensis	LR 25885	Zimbabwe	-	PP851489	Jerusalem et al. (2025)
Phylloporia montana	BDNA2409	Brazil	-	MG738811	Wu et al. (2019b)
Phylloporia montana	BDNA2388	Brazil	-	MG738810	Wu et al. (2019b)
Phylloporia mori	Wu 1105 2	China	-	LC514412	Wu et al. (2020)
Phylloporia mori	Wu 1105 3	China	-	LC514413	Wu et al. (2020)
Phylloporia moricola	Wu 1807 1	China	-	LC589617	Wu et al. (2021)
Phylloporia moricola	Wu 1807 5	China	-	LC589618	Wu et al. (2021)
Phylloporia murrayae	Wu 1404-4	China	-	LC514409	Wu et al. (2020)
Phylloporia murrayae	Wu 1404-5	China	-	LC514410	Wu et al. (2020)
Phylloporia mutabilis	OAB0643	Benin	OR096158	OR096136	Olou et al. (2023)
Phylloporia mutabilis	OAB0666	Benin	OR096159	OR096137	Olou et al. (2023)
Phylloporia nandinae	Dai 10588	China	-	JF712930	Zhou and Dai (2012)
Phylloporia nandinae	Dai 10625	China	-	JF712931	Zhou and Dai (2012)
Phylloporia nodostipitata	FLOR:51173	Brazil	KJ639057	KJ631412	Ferreira-Lopes et al. (2016)

Species	Specimen no.	Locality	GenBank accession no.		Reference
			ITS	nLSU	
Phylloporia nodostipitata	FLOR:51175	Brazil	-	KJ631413	Ferreira-Lopes et al. (2016)
Phylloporia nouraguensis	MUCL/FG-11-404	Guyana	-	KC136223	Decock et al. (2013)
Phylloporia nouraguensis	MUCL/FG-11-409	Guyana	-	KC136224	Decock et al. (2013)
Phylloporia oblongospora	Zhou 179	China	MH151197	JF712932	Cui et al. (2010)
Phylloporia oreophila	Cui 2219	China	MH151196	JF712933	Zhou and Dai (2012)
Phylloporia oreophila	Cui 9503	China	-	JF712934	Zhou and Dai (2012)
Phylloporia oropheae	GXU3728	China	OQ146998	OQ147002	Shao et al. (2025)
Phylloporia oropheae	GXU4511	China	OQ146997	PQ395421	Shao et al. (2025)
Phylloporia osmanthi	Yuan 5655	China	-	KF729938	Zhou (2015b)
Phylloporia parasitica	LR 19843	Argentina	KU198361	-	Decock et al. (2015)
Phylloporia pectinata	R.Coveny 113	Australia	-	AF411823	Wagner and Ryvarden (2002)
Phylloporia pendula	Cui 13691	China	-	KX242357	Chen et al. (2017)
Phylloporia pendula	Cui 13876	China	-	KX901670	Chen et al. (2017)
Phylloporia perangusta	Dai 18139	China	MH151169	MG738803	Wu et al. (2019a)
Phylloporia pseudopectinata	Cui 13746	China	-	KX242355	Chen et al. (2017)
Phylloporia pseudopectinata	Cui 13749	China	-	KX242356	Chen et al. (2017)
Phylloporia pseudoweberiana	KE15-02	Kenya	-	KU358722	Jerusalem et al. (2025)
Phylloporia pulla	Cui 5251	China	-	KU904468	Zhou (2016)
Phylloporia pulla	Dai 9627	China	-	KU904469	Zhou (2016)
Phylloporia radiata	LWZ-2016a	China	-	KU904470	Zhou (2016)
Phylloporia rattanicola	Dai 18233	China	-	MG738807	Wu et al. (2019a)
Phylloporia rattanicola	Dai 18235	China	MH151172	MG738808	Wu et al. (2019a)
Phylloporia ribis	82-828	Germany	-	AF311040	Wagner and Ryvarden (2002)
Phylloporia rigida	MHN240359	China	**PX612033**	-	This study
Phylloporia rigida	MHN240360	China	**PX612034**	-	This study
Phylloporia rinoreae	MUCL: 56283	Gabon	-	MN243144	Jerusalem et al. (2019)
Phylloporia rinoreae	MUCL: 57328	Gabon	-	MN243146	Jerusalem et al. (2019)
Phylloporia rubiacearum	Chen 3583	China	-	LC514416	Wu et al. (2020)
Phylloporia rubiacearum	Chen 3584	China	-	LC514417	Wu et al. (2020)
Phylloporia rzedowskii	MUCL 52859	Mexico	-	HM635673	Valenzuela et al. (2011)
Phylloporia rzedowskii	MUCL 52860	Mexico	-	HM635674	Valenzuela et al. (2011)
Phylloporia sumacoensis	JV2109/73	Ecuador	-	ON006468	Zhou et al. (2022)
Phylloporia solicola	JRF145	Brazil	-	MG738815	Wu et al. (2019a)
Phylloporia spathulata	Chay 456	Mexico	-	AF411822	Ferreira-Lopes et al. (2016)
Phylloporia splendida	Dai 6282	China	-	MG738805	Wu et al. (2019a)
Phylloporia splendida	Cui 8429	China	-	MG738804	Wu et al. (2019a)
Phylloporia tabernaemontanae	Dai 18852	China	-	MZ437409	Wu et al. (2022b)
Phylloporia tabernaemontanae	Dai 18853	China	-	MZ437410	Wu et al. (2022b)
Phylloporia terrestris	Yuan 5738	China	-	KC778784	Zhou (2015b)
Phylloporia terrestris	He 2359	China	MH151189	MH165869	Zhou (2015b)
Phylloporia tiliae	Yuan 5491	China	-	KJ787805	Zhou (2013)
Phylloporia ulloai	MUCL 52866	Mexico	-	HM635677	Valenzuela et al. (2011)
Phylloporia ulloai	MUCL 52867	Mexico	-	HM635678	Valenzuela et al. (2011)
Phylloporia verae-crucis	F19-159	Mexico	-	PP851647	Jerusalem et al. (2025)
Phylloporia warneckeicola	GA12-813	Gabon	-	KJ743253	Jerusalem et al. (2025)
Phylloporia warneckeicola	GA12-814	Gabon	-	KJ743256	Jerusalem et al. (2025)
Phylloporia weberiana	Dai 9242	China	-	JF712936	Sayers et al. (2020)
Phylloporia yuchengii	YG 051	Uzbekistan	-	KM264325	Gafforov et al. (2014)
Pseudowrightoporia crassihypha	Yuan 6247	China	KM 107873	KM 107892	Wang (2018)
Pseudowrightoporia crassihypha	Yuan 5884	China	KM 107872	KM 107891	Wang (2018)
Wrightoporiopsis biennis	Cui 8457	China	KJ 807066	KJ 807074	Zhou et al. (2021)
Wrightoporiopsis biennis	Cui 8506	China	KJ 807067	KJ 807075	Wang (2018)

New species are shown in bold.

The sequences of *Bondarzewia podocarpi* Y.C. Dai & B.K. Cui and *B. occidentalis* Jia J. Chen, B.K. Cui & Y.C. Dai were used as the outgroups for *Dentipellicula*, according to Zhou and Dai (2013). The sequences of *Inonotus andersonii* (Ellis & Everh.) Nikol. and *I. hispidus* (Bull.) P. Karst. were used as the outgroups for *Phylloporia*, according to Olou et al. (2023). Alignments were concatenated in Mesquite v. 3.2. The best-fit model of nucleotide evolution for the datasets was selected with AIC (Akaike Information Criterion) using MrModelTest 2.3 (Posada and Crandall 1998).

Maximum Likelihood (ML) analysis was performed in RAxML v.7.2.8 with a GTR + G + I model (Stamatakis 2006). All model parameters were estimated by the programme, but only the best Maximum-Likelihood tree from all searches was kept. MrModelTest 2.3 (Posada and Crandall 1998; Nylander 2004) was used to determine the best-fit evolution model for each dataset for Bayesian Inference (BI).

BI was performed using MrBayes 3.2.6 with two independent runs, each one beginning from random trees with four simultaneous independent chains, performing 5 million generations, sampling every 100 generations (Ronquist and Huelsenbeck 2003). The first 25% of the sampled trees were discarded as burn-in and a majority rule consensus tree of all remaining trees was calculated.

Branches that received bootstrap support for Maximum Likelihood (ML) and Bayesian posterior probabilities (BPP) greater than or equal to 50% (ML) and 0.95 (BPP) were regarded as prominently supported. Phylogenetic trees were visualised using FigTree v.1.4.2 (http://tree.bio.ed.ac.uk/software/figtree/, accessed on 18 November 2025).

Results

BLAST search results

BLAST searches of the ITS sequences for all specimens (Table 2) showed that MHN240385, MHN240401 and MHN250010 matched *Wrightoporiopsis amylohypha* with query cover of 95%, 95% and 85% and percentage identity of 83.31%, 83.31% and 90.68%, respectively. Specimens MHN240359 and MHN240360 had the top hits to *Phylloporia* sp., with 100%/99% query cover and 87.71%/87.08% percentage identity. These results provided preliminary molecular evidence for the taxonomic assignment of the specimens, supporting subsequent phylogenetic analysis.

Phylogenetic analyses

The combined ITS + nLSU dataset of Hericiaceae included sequences from 23 fungal strains representing 13 taxa. The best-fit model for each partition was TN+F+G4 for ITS and TN+F+I+G4 for nLSU. Bayesian analysis yielded a topology similar to

Table 2. Results of BLAST search for each specimen.

Specimen no.	BLAST results (based on ITS)	Query Cover	Per. Ident
MHN240385	*Wrightoporiopsis amylohypha*	95%	83.31%
MHN240401	*Wrightoporiopsis amylohypha*	95%	83.31%
MHN250010	*Wrightoporiopsis amylohypha*	85%	90.68%
MHN240359	*Phylloporia* sp.	100%	87.71%
MHN240360	*Phylloporia* sp.	99%	87.08%

that from the ML analysis. The Bayesian analysis yielded a concordant topology with an average standard deviation of split frequencies of 0.009999. Only the ML tree is provided in Fig. 1 and the ML (50%) and BI (0.95) are shown at the nodes.

The combined ITS + nLSU dataset of *Phylloporia* included sequences from 131 fungal strains representing 85 taxa. The best models for each region of the combined ITS + nLSU sequence dataset, as estimated and applied in the Bayesian analysis, were both GTR + I + G models. Bayesian analysis yielded a topology similar to that from the ML analysis. The Bayesian analysis resulted in a concordant topology with an average standard deviation of split frequencies = 0.009999. Only the ML tree is provided in Fig. 2 and the ML (50%) and BI (0.95) are shown at the nodes.

Phylogenetic analysis, based on the combined ITS + nLSU dataset (Fig. 1), provided more robust and accurate taxonomic placement of the specimens compared to preliminary BLAST searches. While BLAST results initially matched specimens MHN240385, MHN240401 and MHN250010 to *Wrightoporiopsis*, the phylogenetic tree clearly resolved the three specimens as a distinct, well-supported lineage (100%ML/1.00BI) representing the new species *Dentipellicula hainanensis*, which clustered within *Dentipellicula* rather than *Wrightoporiopsis*.

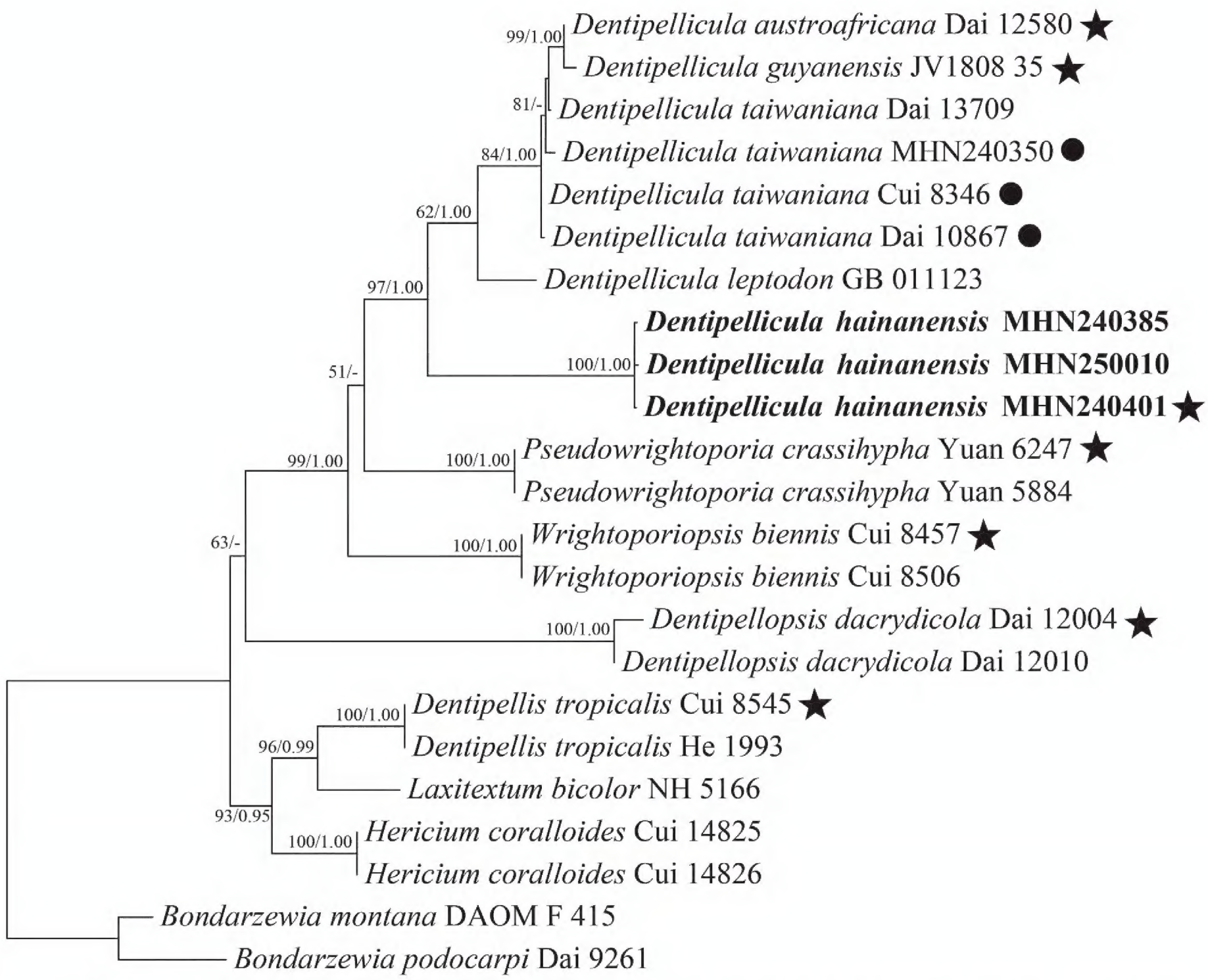
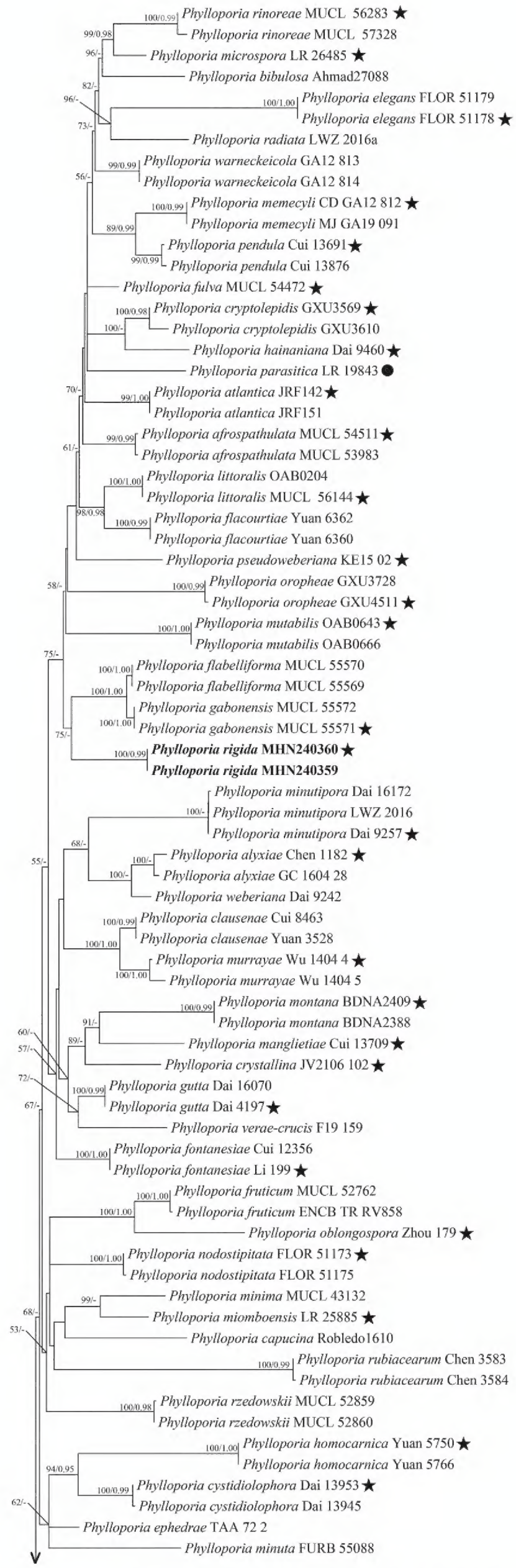


Figure 1. Maximum Likelihood tree illustrating the phylogeny of *Dentipellicula*, based on the combined sequence dataset of ITS + nLSU. Branches are labelled with Maximum Likelihood bootstrap higher than 50% and Bayesian posterior probabilities more than 0.95, respectively. Bold names = new species. Black stars: represent type sequences. Filled circles: represent type species.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Phylloporia rinoreae MUCL 57328
Phylloporia microspora LR 26485 ★
Phylloporia bibulosa Ahmad27088
Phylloporia elegans FLOR 51179
Phylloporia elegans FLOR 51178 ★
Phylloporia radiata LWZ 2016a
Phylloporia warneckeicola GA12 813
Phylloporia warneckeicola GA12 814
Phylloporia memecyli CD GA12 812 ★
Phylloporia memecyli MJ GA19 091
Phylloporia pendula Cui 13691★
Phylloporia pendula Cui 13876
Phylloporia fulva MUCL 54472 ★
Phylloporia cryptolepidis GXU3569 ★
Phylloporia cryptolepidis GXU3610
Phylloporia hainaniana Dai 9460 ★
Phylloporia parasitica LR 19843 ●
Phylloporia atlantica JRF142 ★
Phylloporia atlantica JRF151
Phylloporia afrospathulata MUCL 54511 ★
Phylloporia afrospathulata MUCL 53983
Phylloporia littoralis OAB0204
Phylloporia littoralis MUCL 56144 ★
Phylloporia flacourtiae Yuan 6362
Phylloporia flacourtiae Yuan 6360
Phylloporia pseudoweberiana KE15 02 ★
Phylloporia oropheae GXU3728
Phylloporia oropheae GXU4511 ★
Phylloporia mutabilis OAB0643 ★
Phylloporia mutabilis OAB0666
Phylloporia flabelliforma MUCL 55570
Phylloporia flabelliforma MUCL 55569
Phylloporia gabonensis MUCL 55572
Phylloporia gabonensis MUCL 55571 ★
Phylloporia rigida MHN240360 ★
Phylloporia rigida MHN240359
Phylloporia minutipora Dai 16172
Phylloporia minutipora LWZ 2016
Phylloporia minutipora Dai 9257 ★
Phylloporia alyxiae Chen 1182 ★
Phylloporia alyxiae GC 1604 28
Phylloporia weberiana Dai 9242
Phylloporia clausenae Cui 8463
Phylloporia clausenae Yuan 3528
Phylloporia murrayae Wu 1404 4 ★
Phylloporia murrayae Wu 1404 5
Phylloporia montana BDNA2409 ★
Phylloporia montana BDNA2388
Phylloporia manglietiae Cui 13709 ★
Phylloporia crystallina JV2106 102 ★
Phylloporia gutta Dai 16070
Phylloporia gutta Dai 4197 ★
Phylloporia verae-crucis F19 159
Phylloporia fontanesiae Cui 12356
Phylloporia fontanesiae Li 199 ★
Phylloporia fruticum MUCL 52762
Phylloporia fruticum ENCB TR RV858
Phylloporia oblongospora Zhou 179 ★
Phylloporia nodostipitata FLOR 51173 ★
Phylloporia nodostipitata FLOR 51175
Phylloporia minima MUCL 43132
Phylloporia miomboensis LR 25885 ★
Phylloporia capucina Robledo1610
Phylloporia rubiacearum Chen 3583
Phylloporia rubiacearum Chen 3584
Phylloporia rzedowskii MUCL 52859
Phylloporia rzedowskii MUCL 52860
Phylloporia homocarnica Yuan 5750 ★
Phylloporia homocarnica Yuan 5766
Phylloporia cystidiolophora Dai 13953 ★
Phylloporia cystidiolophora Dai 13945
Phylloporia ephedrae TAA 72 2
Phylloporia minuta FURB 55088

Figure 2. Maximum Likelihood tree illustrating the phylogeny of *Phylloporia*, based on the combined sequence dataset of ITS+nLSU. Branches are labelled with Maximum Likelihood bootstrap higher than 50% and Bayesian posterior probabilities more than 0.95, respectively. Bold names = new species. Black stars: represent type sequences. Filled circles: represent type species.

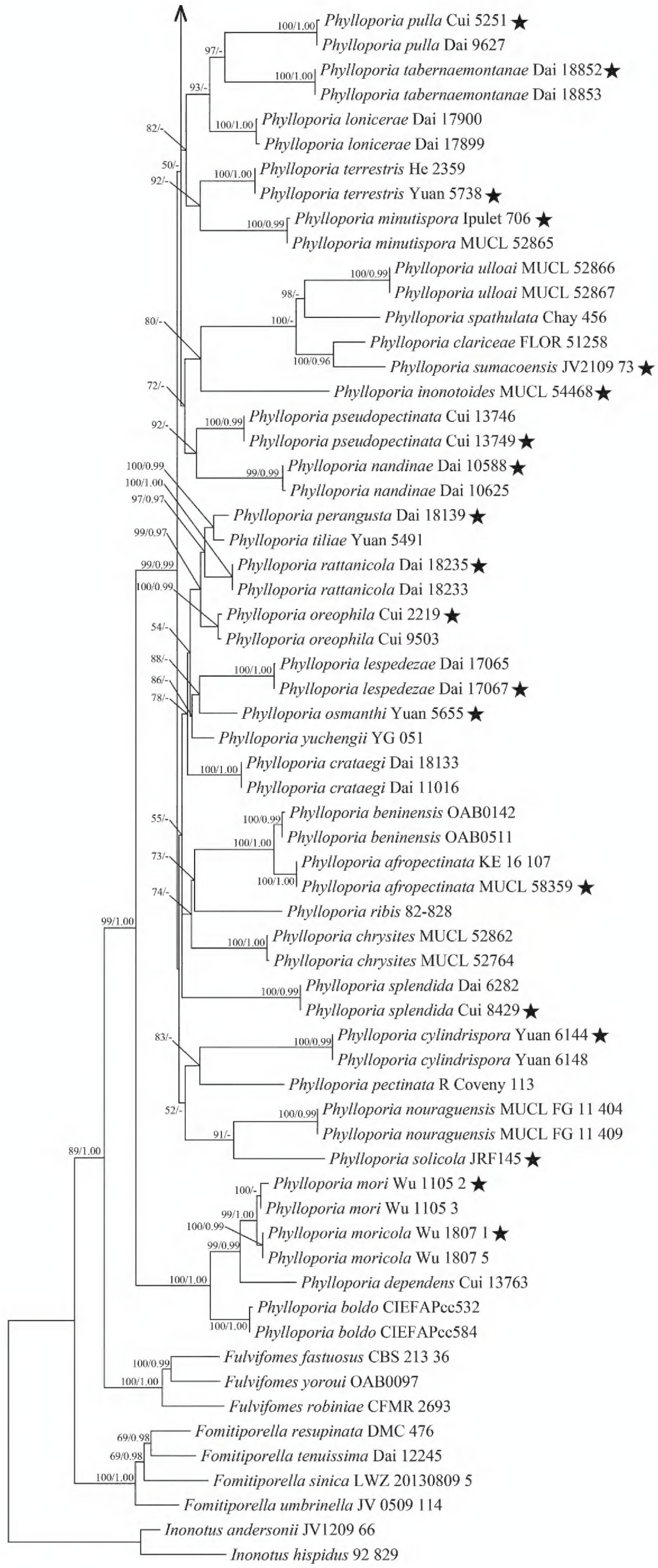

Phylloporia pulla Cui 5251 ★
Phylloporia pulla Dai 9627
Phylloporia tabernaemontanae Dai 18852★
Phylloporia tabernaemontanae Dai 18853
Phylloporia lonicerae Dai 17900
Phylloporia lonicerae Dai 17899
Phylloporia terrestris He 2359
Phylloporia terrestris Yuan 5738 ★
Phylloporia minutispora Ipulet 706 ★
Phylloporia minutispora MUCL 52865
Phylloporia ulloai MUCL 52866
Phylloporia ulloai MUCL 52867
Phylloporia spathulata Chay 456
Phylloporia clariceae FLOR 51258
Phylloporia sumacoensis JV2109 73 ★
Phylloporia inonotoides MUCL 54468★
Phylloporia pseudopectinata Cui 13746
Phylloporia pseudopectinata Cui 13749★
Phylloporia nandinae Dai 10588★
Phylloporia nandinae Dai 10625
Phylloporia perangusta Dai 18139★
Phylloporia tiliae Yuan 5491
Phylloporia rattanicola Dai 18235★
Phylloporia rattanicola Dai 18233
Phylloporia oreophila Cui 2219★
Phylloporia oreophila Cui 9503
Phylloporia lespedezae Dai 17065
Phylloporia lespedezae Dai 17067★
Phylloporia osmanthi Yuan 5655★
Phylloporia yuchengii YG 051
Phylloporia crataegi Dai 18133
Phylloporia crataegi Dai 11016
Phylloporia beninensis OAB0142
Phylloporia beninensis OAB0511
Phylloporia afropectinata KE 16 107
Phylloporia afropectinata MUCL 58359 ★
Phylloporia ribis 82-828
Phylloporia chrysites MUCL 52862
Phylloporia chrysites MUCL 52764
Phylloporia splendida Dai 6282
Phylloporia splendida Cui 8429★
Phylloporia cylindrispora Yuan 6144 ★
Phylloporia cylindrispora Yuan 6148
Phylloporia pectinata R Coveny 113
Phylloporia nouraguensis MUCL FG 11 404
Phylloporia nouraguensis MUCL FG 11 409
Phylloporia solicola JRF145★
Phylloporia mori Wu 1105 2 ★
Phylloporia mori Wu 1105 3
Phylloporia moricola Wu 1807 1★
Phylloporia moricola Wu 1807 5
Phylloporia dependens Cui 13763
Phylloporia boldo CIEFAPcc532
Phylloporia boldo CIEFAPcc584
Fulvifomes fastuosus CBS 213 36
Fulvifomes yoroui OAB0097
Fulvifomes robiniae CFMR 2693
Fomitiporella resupinata DMC 476
Fomitiporella tenuissima Dai 12245
Fomitiporella sinica LWZ 20130809 5
Fomitiporella umbrinella JV 0509 114
Inonotus andersonii JV1209 66
Inonotus hispidus 92 829

Figure 2. Continued.

For specimens MHN240359 and MHN240360, BLAST searches targeting their ITS sequences initially identified *Phylloporia* sp. as the top homologous matches. This initial taxonomic assignment was robustly supported by our phylogenetic analysis of the combined ITS + nLSU dataset (Fig. 2), which confidently positioned both specimens within *Phylloporia*. Notably, the two specimens clustered together in a well-supported, monophyletic clade (100% ML/0.99 BI), indicating that they merit recognition as a new species in *Phylloporia*.

Taxonomy

Dentipellicula hainanensis **C.G. Song & Z.F. Jia, sp. nov.**

MycoBank No: 861880

Figs 3, 4

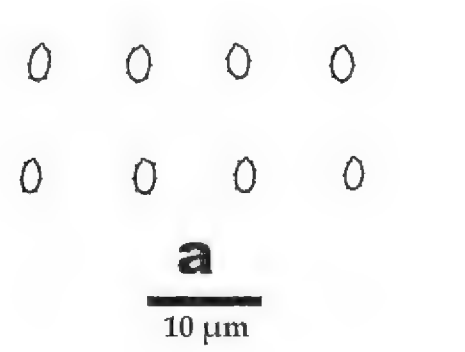
Diagnosis. Differs from other *Dentipellicula* species by its resupinate, soft corky and tomentose, basidiomata, uneven pileal surface and the presence of clamp connections in generative hyphae.

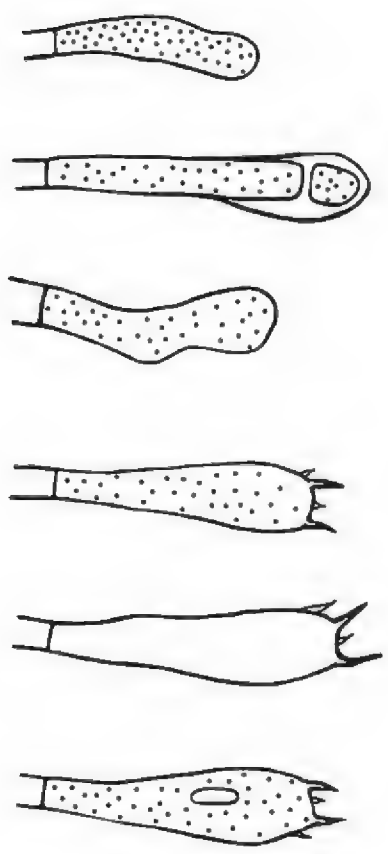
Type. China • Hainan Province, Yinggeling National Nature Reserve, on fallen wood, alt. 670 m, 19°02'24"N, 109°34'12"E, 31 December 2024, MHN240401.

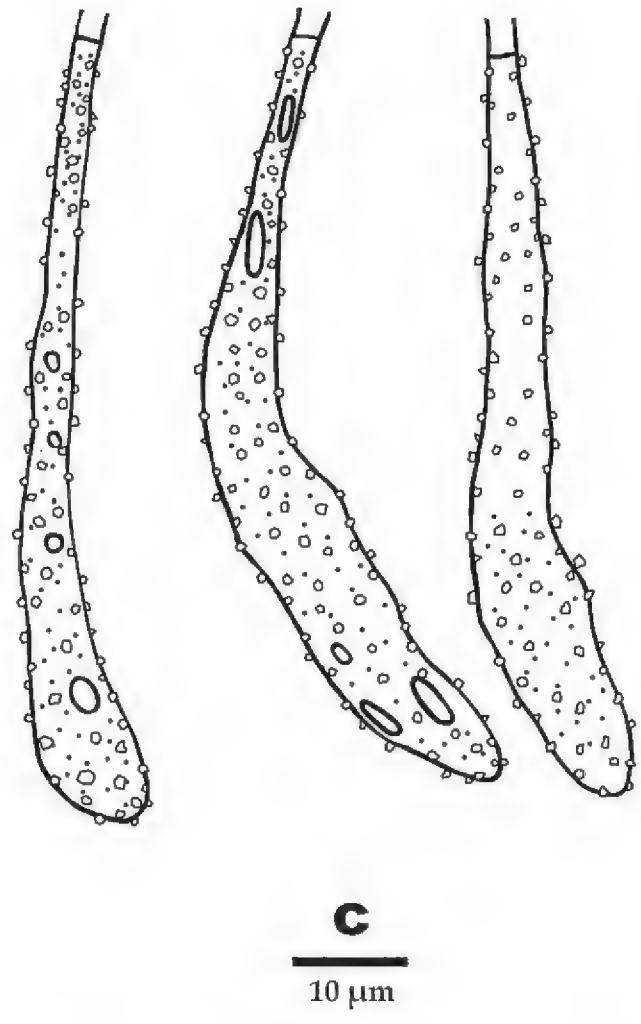
Etymology. *Hainanensis* (Lat.) refers to the holotype locality of the species in Hainan Province.

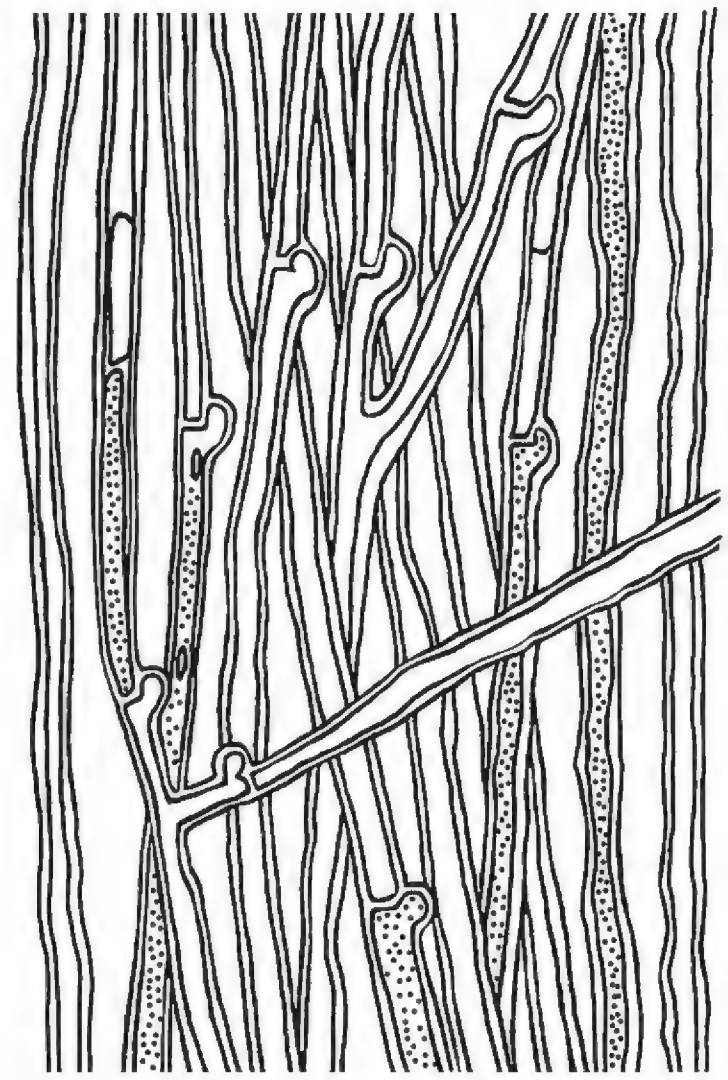
Fruiting body. Basidiomata annual, resupinate, without odour or taste. Pileus fan-shaped to nearly circular, up to 2.5 cm in diam., 0.3 cm thick at centre. Pileal surface greyish-orange (5B5) to light orange (6A5) to pinkish-buff, uneven,

Figure 3. Basidiocarps of *Dentipellicula hainanensis*. Scale bars: 2 cm (**a–d**); 0.3 cm (**e**).









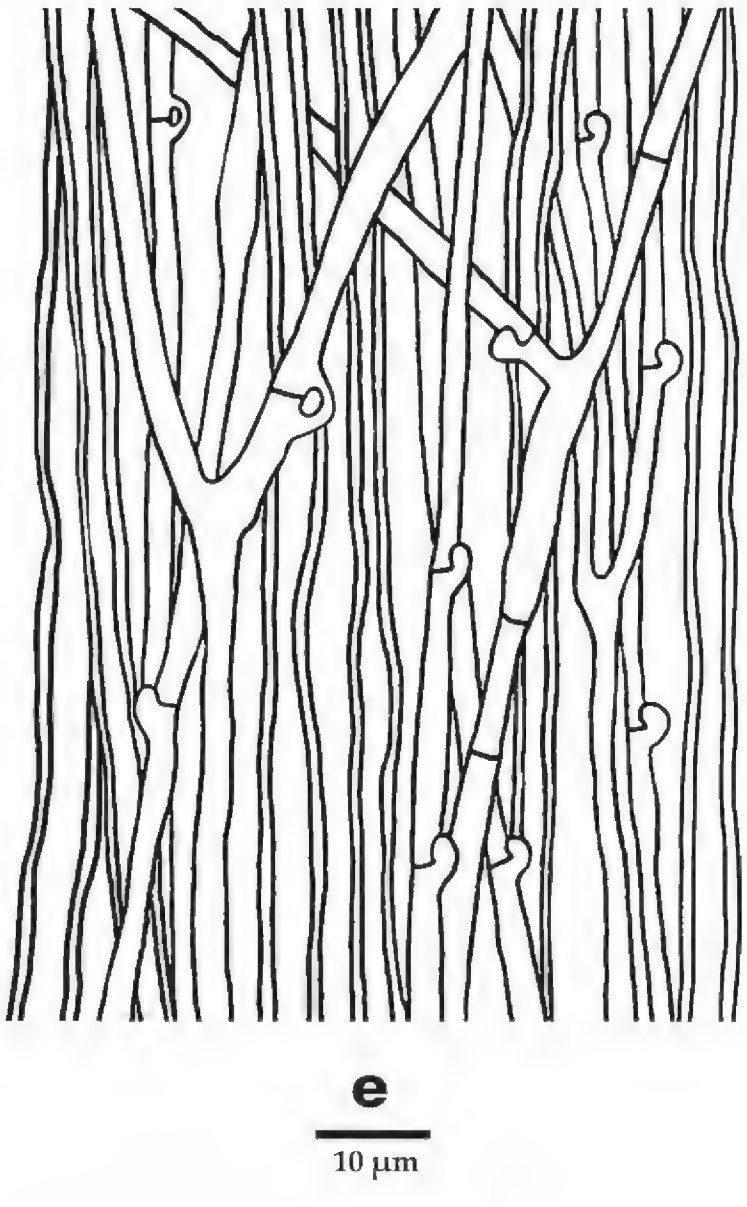


Figure 4. Microscopic structures of *Dentipellicula hainanensis* (drawn from the holotype). **a.** Basidiospores; **b.** Basidia and basidioles; **c.** Gloeocystidia; **d.** Hyphae from context; **e.** Hyphae from spines.

azonate, tomentose; margin darker than the middle, greyish-orange (6B5) buff, up to 0.35 cm wide. Fresh spines soft, light orange (6A5) to greyish-orange (6B5) when fresh, becoming fragile, upon drying, up to 2 mm long, 7–9 per mm across base. Subiculum soft corky, concolorous with pileal surface, up to 0.2 cm thick.

Microstructure. Hyphal system monomitic; generative hyphae with clamp connections; IKI–, CB–; tissue unchanged in KOH. Generative hyphae in context hyaline, thick-walled, occasionally branched, interwoven to regularly arranged and 3–6 µm in diam. Generative hyphae in spines hyaline, thin- to thick-walled, occasionally branched, regularly arranged and 3–5 µm in diam. Gloeocystidia present, rooting deep from the trama, often encrusted, 8–11.6 µm in diam., cystidioles absent. Basidia clavate, 4-spored, 16–23 × 3.8–7.5 µm; basidioles similar to basidia in shape. Basidiospores, hyaline, ellipsoid, thick-walled, echinulate, IKI+, CB–, (2.8–)3–4.7(–5.2) × 3.2–4.2(–4.4) µm, L = 4 µm, W = 3.6 µm, Q = 1.03–1.32 (n = 90/3).

Additional specimens (paratypes) examined. • Hainan Province, Changjiang County, Bawangling, Yajia Scenic Area, on a branch, alt. 630 m, 19°05'06"N, 109°07'22.8"E, 30 December 2024, MHN240385; Yinggeling National Nature Reserve, on fallen wood, alt. 670 m, 19°03'10.8"N, 109°33'50.4"E, 1 January 2025, MHN250010.

Phylloporia rigida C.G. Song & Z.F. Jia, sp. nov.

MycoBank No: 861881

Figs 5, 6

Diagnosis. Differs from other *Phylloporia* species by its pileate, sessile basidiomata, fawn to reddish-brown and fan-shaped pileal surface, salmon to peach pileal margin, cream to buff yellow tubes and monomitic hyphal system and ellipsoid, thick-walled basidiospores.

Type. China • Hainan Province, Changjiang County, Bawangling Yajia Scenic Area, on the living tree of *Garcinia oblongifolia* Champ. ex Benth., alt. 495 m, 19°05'06"N, 109°07'22.8"E, 30 December 2024, MHN240360.

Etymology. *Rigida* (Lat.) refers to the rigid basidiomata.

Fruiting body. Basidiomata annual, epixylous, pileate, sessile, without odour or taste. Pileus applanate to nearly half round, up to 4 cm in diam., 2 cm thick at centre. Pileal surface greyish-orange (6B5), uneven, azonate, fibrous to tomentose; margin greyish-orange (6B4), greyish-red (7B6) to dull red (8B3), wave, up to 1.2 cm wide. Tube light orange (6A4) when fresh, tough upon drying, up to 1 mm long, 5–7 per mm. Context, rigid, duplex, with a lower corky context separated from an upper trichoderm by a thin black line, up to 0.4 cm thick.

Microstructure. Hyphal system monomitic; generative hyphae with simple septa; IKI–, CB–; tissue darker in KOH. Generative hyphae in context yellowish-brown, slightly thick-walled, occasionally branched, interwoven to regularly arranged and 3–8 µm in diam. Generative hyphae in tubes yellowish-brown, thick-walled, often branched, regularly arranged and 2–6 µm in diam. Gloeocystidia absent. Cystidioles present, 10.5–13.5 × 1–3.5 µm in diam. Basidia clavate, 4-spored, 9–13 × 2.5–5 µm; basidioles similar to basidia in shape. Basidiospores ellipsoid, oblong-ellipsoid to cylindrical, yellow-brown, ellipsoid, thick-walled, IKI–, CB–, 2.3–4.5 × 2.2–3.8 µm, L = 3.31 µm, W = 2.83 µm, Q = 1–1.32 (n = 60/2).

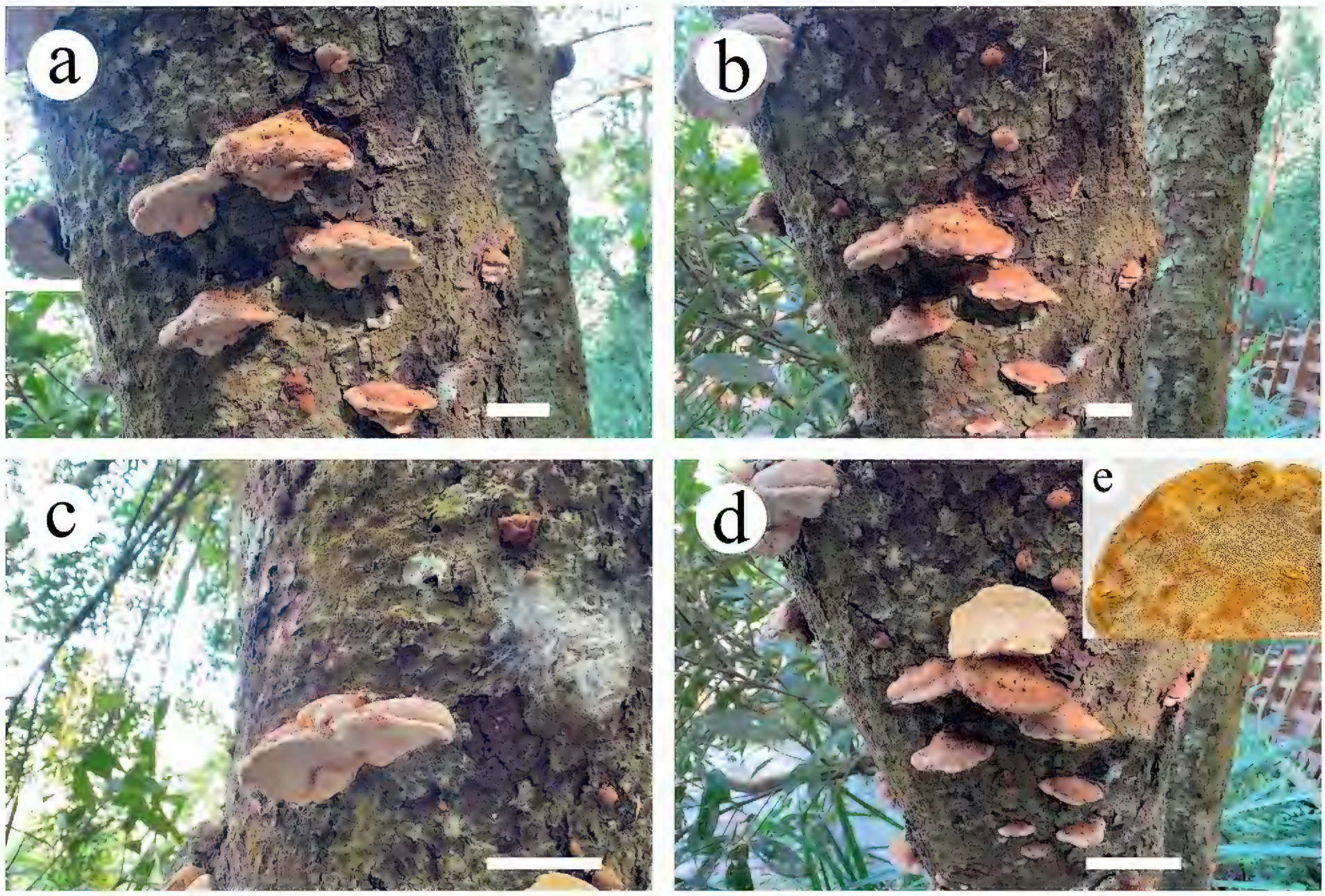
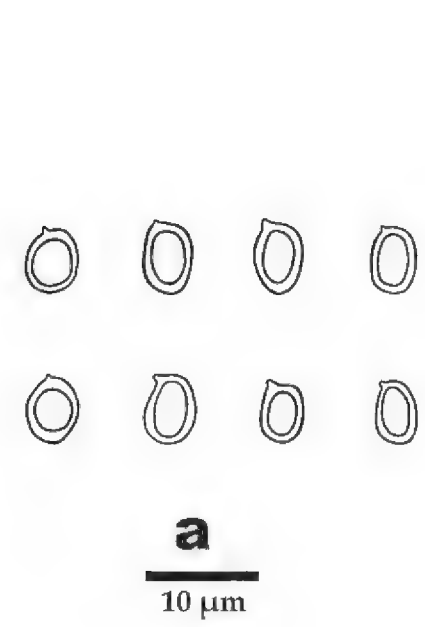


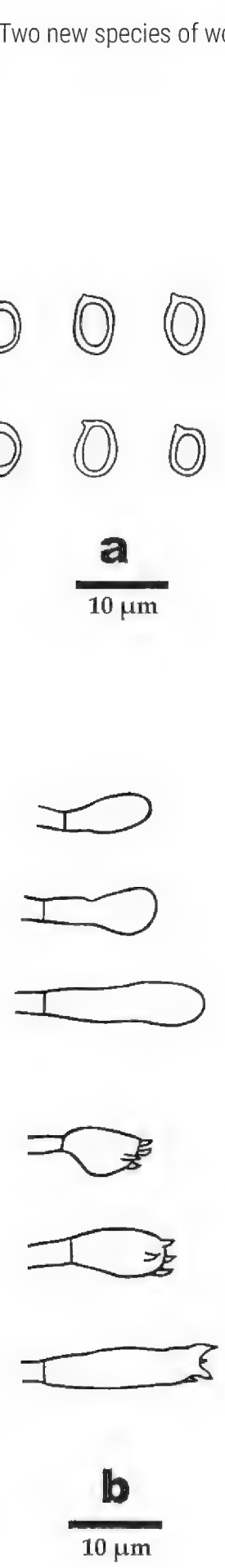
Figure 5. Basidiocarps of *Phylloporia rigida*. Scale bars: 2 cm (**a–d**); 0.3 cm (**e**).

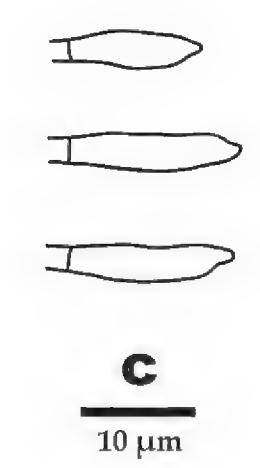
Additional specimen (paratype) examined. China • Hainan Province, Changjiang County, Bawangling Yajia Scenic Area, on a living tree of *Garcinia oblongifolia*, alt. 495 m, 19°05'06"N, 109°07'22.8"E, 30 December 2024, MHN240359.

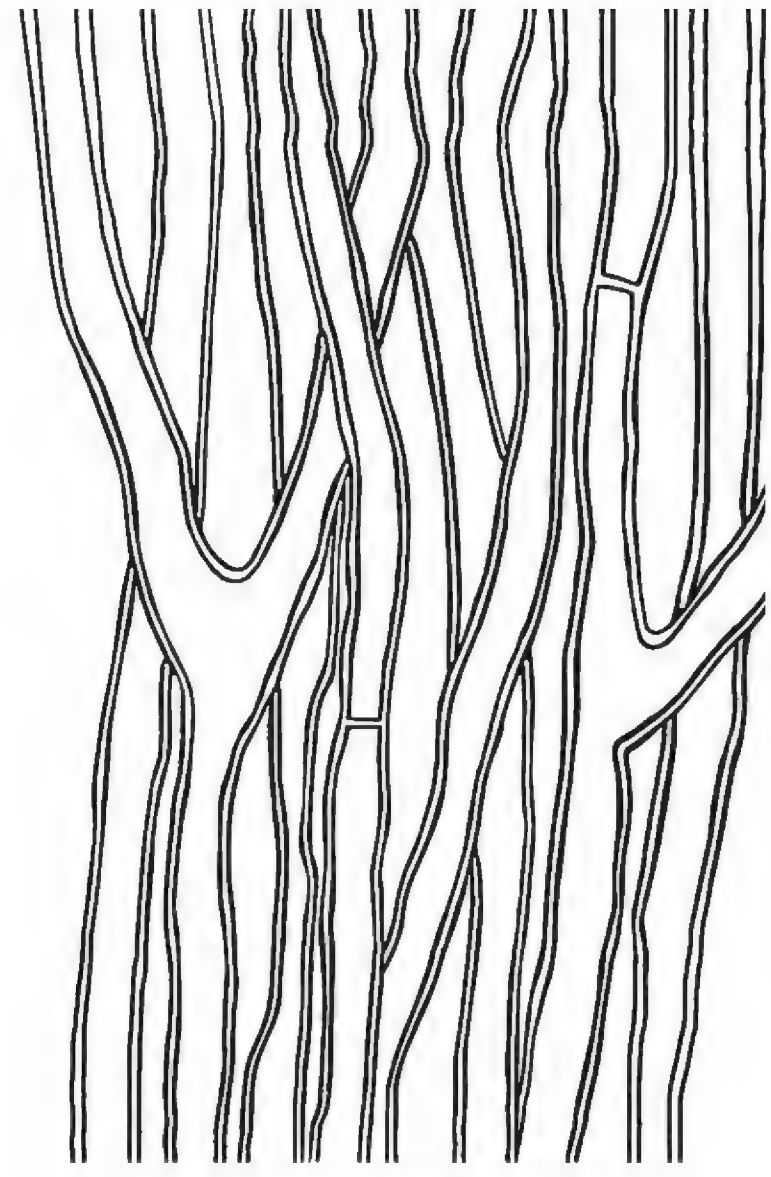
Discussion

In the present study, phylogenetic analysis of the combined ITS and nLSU sequences revealed that *Dentipellicula hainanensis* is distantly related to *Dentipellis*, *Hericium* and *Laxitextum*, but clusters within the *Dentipellicula* clade (Fig. 1). *Dentipellicula hainanensis* formed a single lineage, different from other species of *Dentipellicula* in our phylogenetic analyses (Fig. 1). Morphologically, *D. hainanensis* might be confused with *D. leptodon* in having cottony pileus, pale yellow spines and the presence of clamp connections in generative hyphae (Ginns 1986). However, *D. leptodon* is distinguished by its white pileus margin, longer spines measuring 3–5 mm, longer basidia measuring 20–26 × 4–5 µm and narrower basidiospores measuring 3.7 × 2.8 µm (Ginns 1986). The prevalence of newly-described species in subtropical and tropical areas indicates a remarkable richness of *Phylloporia* in these regions (Anonymous 1997; Decock et al. 2015; Olou et al. 2021, 2023; Wu et al. 2022b; Zhou et al. 2022; Jerusalem et al. 2025). In the present study, one new species of *Phylloporia* is described from Hainan Province, based on morphological characters and phylogenetic analyses of the combined ITS + nLSU sequences. The main morphological characteristics of each *Phylloporia* species from China were summarised in Table 3.









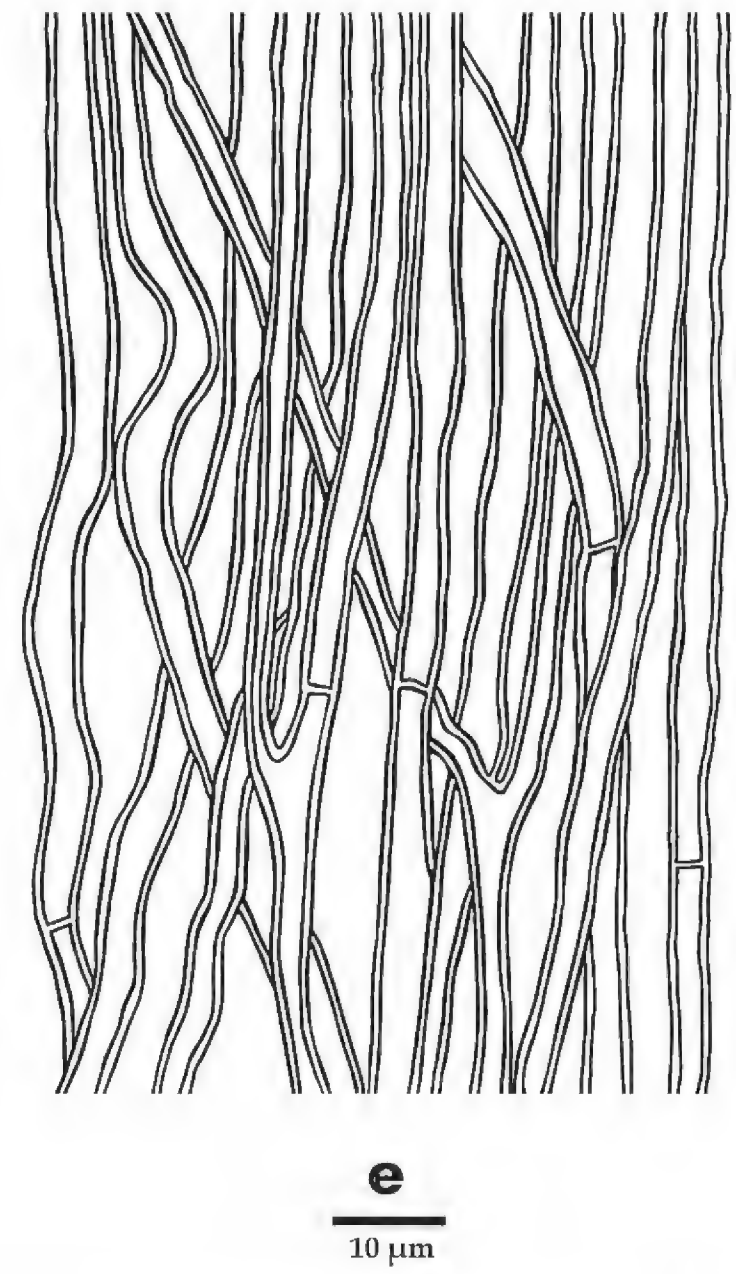


Figure 6. Microscopic structures of *Phylloporia rigida* (drawn from the holotype). **a.** Basidiospores; **b.** Basidia and basidioles; **c.** Cystidioles; **d.** Hyphae from context; **e.** Hyphae from spines.

Table 3. The ecological habits and main morphological characters of species in *Phylloporia* from China.

Species	Ecological habits	Basidiomata	Pores	Context	Hyphal system	Cystidioles	Basidiospores (μm)	Wu et al. (2020)
P. alyxiae	on living *Alyxia insularis*	perennial, pileate	6–8 per mm	duplex with a black line	dimitic	present	(2.8–)3–3.2(–3.5) × (2–)2.2–2.7	Zhou (2015a)
P. clausenae	on living *Crataegus*	annual, pileate	8–9 per mm	duplex with two black zones	monomitic	absent	3–3.5 × 2–3	Zhou and Dai (2012)
P. crataegi	on living *Crataegus*	perennial, pileate	7–9 per mm	duplex with a black line	monomitic	absent	2.5–3.3 × 2–2.8	Shao et al. (2025)
P. cryptolepidis	on the branch of living *Cryptolepis buchananii*	annual, pileate	5–6 per mm	duplex with a black line	monomitic	absent	(3.2–)3.6–4.6(–4.7) × (2.2)2.5–3.5(–3.9)	Zhou (2015a)
P. cylindrispora	on living angiosperm	annual, pileate	6–8 per mm	duplex with a black line	monomitic	absent	3.5–4 × 1.5–2	Wu et al. (2019b)
P. cystidiolophora	on living angiosperm	annual, pileate	8–10 per mm	duplex with a black line	monomitic	present	2.5–3 × 2.1–2.8	Liu et al. (2015)
P. dependens	on living angiosperm	perennial, pileate to pendent	7–9 per mm	homogenous	monomitic	present	3–3.4 × 2.7–3	Zhou (2015a)
P. flacourtiae	on living *Flacourtia*	annual, pileate	5–7 per mm	duplex without black line	monomitic	absent	3.7–4.4 × 2.5–3.2	Zhou and Dai (2012)
P. fontanesiae	on living *Fontanesia*	annual, pileate	10–12 per mm	duplex with a black line	monomitic	absent	2.5–3 × 2–2.5	Zhou and Dai (2012)
P. gutta	on dead *Abelia* and other angiosperm	perennial, pileate	7–9 per mm	duplex with a black line	monomitic	absent	3–4 × 2–2.5	Cui et al. (2010)
P. hainaniana	on living angiosperm	annual, pileate	4–6 per mm	duplex with a black line	monomitic	absent	4.6–5.6 × 3–3.6	Zhou (2015a)
P. homocarnica	on dead angiosperm	annual, pileate	4–6 per mm	homogenous	monomitic	absent	4–4.9 × 2.5–3	Ren and Wu (2017)
P. lespedezae	on living *Lespedeza*	annual, pileate	8–9 per mm	duplex with a black line	monomitic	present	3.1–3.7 × 2.2–2.7	Qin et al. (2018)
P. lonicerae	on living *Lonicera*	perennial, pileate	6–8 per mm	duplex with a black line	dimitic	absent	3–3.3 × 2.1–2.5	Chen et al. (2017)
P. manglietiae	on living *Manglietia*	perennial, pileate	6–8 per mm	duplex with a black line	monomitic	absent	3–3.5 × 2–2.5	Zhou (2016)
P. minutipora	on living angiosperm	annual, pileate	12–15 per mm	duplex with a black line	dimitic	absent	2.5–3 × 2–2.4	Wu et al. (2022b)
P. minutissima	on living angiosperm shrub	annual, pileate	12–13 per mm	duplex with a black line	monomitic	absent	(2.9–)3 3.5(–3.6) × (1.8–)2–2.3(–2.5)	Wu et al. (2020)
P. mori	on fallen trunk of *Morus*	perennial, resupinate to effused reflexed	7–9 per mm	homogeneous	dimitic	present	(3.8–)4–4.7(–5) × 3.1–3.6(–4)	Wu et al. (2021)
P. moricola	on living tree of *Morus*	perennial, resupinate to effused reflexed	7–9 per mm	duplex with a black line	dimitic	absent	(3.2–)3.5–4 × (2.5)2.8–3.1(–3.3)	Wu et al. (2020)
P. murrayae	on living *Murraya paniculata*	perennial, pileate	8–10 per mm	duplex without black line	dimitic	absent	(3–)3.2–3.7 × (2.5–)2.8–3(–3.2)	Zhou and Dai (2012)
P. nandinae	on living *Nandina*	annual, pileate	5–6 per mm	duplex with a black line	monomitic	absent	3.5–4.2 × 2–2.5	Cui et al. (2010)
P. oblongospora	on living angiosperm	annual, pileate	2–4 per mm	homogenous	monomitic	absent	4–4.8 × 2–2.5	Zhou and Dai (2012)
P. oreophila	on living angiosperm	annual, pileate	7–9 per mm	duplex with a black line	monomitic	absent	3–3.7 × 2–3	Shao et al. (2025)
P. oropheae	on branch of living *orophea hainanensis*	annual, pileate	3–4 per mm	duplex with a black line	dimitic	absent	(4.1–) 4.2–5.3(–5.7) × (2.5–)2.6–3.8(–3.9)	Zhou (2015b)
P. osmanthi	on living *Osmanthus*	annual, pileate	7–9 per mm	duplex with a black line	monomitic	present	2.9–3.4 × 2–2.6	Wu et al. (2019b)

Species	Ecological habits	Basidiomata	Pores	Context	Hyphal system	Cystidioles	Basidiospores (µm)	Wu et al. (2020)
P. perangusta	on living angiosperm	perennial, pileate	9–11 per mm	duplex with a black line	dimitic	present	2.5–2.9 × 1.8–2	Chen et al. (2017)
P. pendula	on living angiosperm	annual, pileate	7–9 per mm	duplex with a black line	dimitic	absent	3.5–4 × 2.5–3	Chen et al. (2017)
P. pseudopectinata	on living angiosperm	annual, pileate	8–9 per mm	duplex with a black line	dimitic	absent	3–3.5 × 2–3	Yombiyeni et al. (2015)
P. pulla	unknown substrate	Annual, pileate	11–12 per mm	duplex	dimitic	absent	2.8–3.3 × 2.3–2.8	Zhou (2016)
P. radiata	on living lianas	annual, pileate	8–10 per mm	duplex with a black line	monomitic	absent	2.5–3.5 × 2–2.5	Wu et al. (2019b)
P. rattanicola	on lianas	perennial, pileate	9–11 per mm	duplex with a black line	dimitic	present	2.9–3.1 × 2–2.1	This study
P. rigida	on living *Garcinia oblongifolia*	annual, pileate	5–7 per mm	duplex with a black line	monomitic	present	2.3–4.5 × 2.2–3.8	Wu et al. (2020)
P. rubiacearum	on living trees of Rubiaceae	perennial, pileate	7–9 per mm	duplex with a black line	dimitic	present	3–3.5 × (2.2–)2.3–2.8(–2.9)	Wu et al. (2019b)
P. splendida	on living angiosperm	annual, pileate	9–10 per mm	duplex with a black line	monomitic	present	3.2–4 × 2.1–2.8	Wu et al. (2019b)
P. subpulla	on living angiosperm	perennial, pileate	13–16 per mm	duplex with a black line	dimitic	absent	2.7–3 × 1.9–2.1	Zhou (2015b)
P. terrestris	on ground	annual, stipitate	10–14 per mm	duplex with a black line	monomitic	absent	2.5–3.3 × 1.8–2.5	Zhou (2013)
P. tiliae	on living *Tilia*	perennial, pileate	9–12 per mm	duplex with a black line	monomitic	absent	3–3.4 × 2–2.5	Dai (2010)
P. weberiana	on living angiosperm	annual, pileate	6–8 per mm	duplex with a black line	monomitic	absent	3.4 4.1 × 2.2–3	Dai (2010)

Phylloporia rigida grouped with *Phylloporia flabelliformis* Decock & Yombiy. and *Phylloporia gabonensis* Decock & Yombiy. in our phylogenetic analyses (Fig. 2). Morphologically, *P. flabelliformis* and *P. gabonensis* are similar to *P. rigida* in having pileate, sessile basidiomata and cork-coloured pileal surface and similar basidia. However, *P. flabelliformis* is distinguished by its shiny, smooth pileal surface, thin context, white pileal margin and smaller basidiospores, measuring (3–)3.3–4 × (2.2–)2.5–2.8(–3) µm (Decock et al. 2015). *Phylloporia gabonensis* is distinguished by its dull, smooth pileal surface, thin, irregular, pale yellow to pale greyish-orange pileal margin and slightly smaller basidiospores, measuring 3.7–4.2(–5) × 2.7–3(–3.3) µm (Decock et al. 2015).

For ecological traits, *Dentipellicula* species predominantly grow on angiosperms and are frequently found on fallen trunks and dead trees (Chen et al. 2015; Wang 2018; Zhou et al. 2021). However, the genus *Phylloporia* displays marginally distinct ecological traits. Most *Phylloporia* species are parasitic on living hardwood hosts; however, a few species grow on deadwood and speciation in this genus is likely promoted by the colonisation of new hosts and the adaptive evolution that follows (Wu et al. 2019a). High levels of host specificity are displayed by the majority of Phylloporia species that parasitise living hardwood hosts (Table 2) (Wagner and Ryvarden 2002). It indicated that species in *Phylloporia* are host-biased, which can be used as an auxiliary basis for species discovery and identification.

Key to accepted species of *Dentipellicula*

1 Pileal surface buff yellow to pinkish-buff ..... ***D. hainanensis***
– Pileal surface with different colour **2**
2 Basidiospores > 3.5 µm long ..... ***D. leptodon***
– Basidiospores < 3.5 µm long **3**

3 Spines 8–10 per mm ..... ***D. austroafricana***
– Spines 5–7 per mm **4**
4 Basidiocarps resupinate; gloeoplerous hyphae present ..... ***D. guyanensis***
– Basidiocarps effused-reflexed; gloeoplerous hyphae absent ... ***D. taiwaniana***

Key to species of *Phylloporia* from China

1 Basidiomata stipitate ..... ***P. terrestris***
– Basidiomata sessile **2**
2 Hyphal system dimitic **3**
– Hyphal system monomitic **16**
3 Pores > 12 per mm **4**
– Pores < 12 per mm **5**
4 Basidiomata perennial; basidiospores 1.9–2.1 µm wide, basidia 11–13 µm long ..... ***P. subpulla***
– Basidiomata annual; basidiospores 2–2.5 µm wide, basidia 5–7 µm long ..... ***P. minutipora***
5 Basidiomata perennial **6**
– Basidiomata annual **13**
6 Cystidioles absent **7**
– Cystidioles present **9**
7 Basidiocarps resupinate to effused reflexed ..... ***P. moricola***
– Basidiocarps pileate **8**
8 Basidiomata pendent, basidia 7–18 µm long ..... ***P. murrayae***
– Basidiomata not pendent, basidia 13–15 µm long ..... ***P. Lonicerae***
9 Basidiocarps resupinate to effused reflexed ..... ***P. mori***
– Basidiocarps pileate **10**
10 Pores > 9 per mm **11**
– Pores < 9 per mm **12**
11 Upper tomentum up to 2 mm thick; basidiospores 2.5–2.9 µm long ..... ***P. perangusta***
– Upper trichoderm up to 0.5 mm thick; basidiospores 2.9–3.1 µm long ..... ***P. rattanicola***
12 Pores 6–8 per mm ..... ***P. alyxiae***
– Pores 7–9 per mm ..... ***P. rubiacearum***
13 Pores > 9 per mm ..... ***P. pulla***
– Pores < 9 per mm **14**
14 Pores > 4 per mm **15**
– Pores < 4 per mm ..... ***P. oropheae***
15 Basidiomata pendent; basidiospores 3.5–4 µm long ..... ***P. pendula***
– Basidiomata not pendent; basidiospores 2.8–3.5 µm long ..... ***P. pseudopectinata***
16 Context homogeneous **17**
– Context duplex **19**
17 Basidiospores broadly ellipsoid to subglobose ..... ***P. dependens***
– Basidiospores ellipsoid to oblong-ellipsoid **18**
18 Pores 4–6 per mm; basidiospores 2.5–3 µm wide ..... ***P. homocarnica***
– Pores 2–4 per mm; basidiospores 2–2.5 µm wide ..... ***P. oblongospora***

19 Black line absent in context **20**
– Black line present in context **21**
20 Basidiospores 2–2.5 µm wide ..... ***P. nandinae***
– Basidiospores 2.5–3.5 µm wide ..... ***P. flacourtiae***
21 Basidiospores broadly ellipsoid to subglobose **22**
– Basidiospores ellipsoid, oblong-ellipsoid to cylindrical **29**
22 Cystidioles present **23**
– Cystidioles absent **24**
23 Basidiospores broadly ellipsoid, 3.1–3.7 µm long ..... ***P. lespedezae***
– Basidiospores subglobose to broadly ellipsoid, 2.5–3 µm long ..... ***P. cystidiolophora***
24 Basidia > 15 µm long ..... ***P. oreophila***
– Basidia < 15 µm long **25**
25 Pores > 10 per mm ..... ***P. fontanesiae***
– Pores < 10 per mm **26**
26 Basidia > 5.5 µm long **27**
– Basidia < 5.5 µm long ..... ***P. manglietiae***
27 Tramal hyphae interwoven ..... ***P. crataegi***
– Tramal hyphae subparallel **28**
28 Pileal surface not radially striate, two black zones present in context ..... ***P. clausenae***
– Pileal surface radially striate, one black zone present in context ..... ***P. radiata***
29 Cystidioles present **30**
– Cystidioles absent **32**
30 Pores > 9 per mm; basidia > 13 µm long ..... ***P. splendida***
– Pores < 9 per mm; basidia < 13 µm long **31**
31 Pores > 7 per mm ..... ***P. osmanthi***
– Pores < 7 per mm ..... ***P. rigida***
32 Basidia > 19 µm long ..... ***P. cryptolepidis***
– Basidia < 19 µm long **33**
33 Basidiospores ellipsoid **34**
– Basidiospores cylindrical ..... ***P. cylindrispora***
34 Basidiomata perennial **35**
– Basidiomata annual **36**
35 Pores > 9 per mm ..... ***P. tiliae***
– Pores < 9 per mm ..... ***P. gutta***
36 Pores > 6 per mm **37**
– Pores < 6 per mm ..... ***P. hainaniana***
37 Basidiospores 3–3.5 µm long ..... ***P. minutissima***
– Basidiospores 3.4–4.1 µm long ..... ***P. weberiana***

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

Use of AI

No use of AI was reported.

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Author contributions

Z.-F.J. designed the research; C.-G.S. prepared the samples; G.-J.T. and B.-W.Y. conducted the molecular experiments and analysed the data; C.-G.S. drafted the manuscript. All authors have read and agreed to the published version of the manuscript.

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Data availability

All of the data that support the findings of this study are available in the main text.

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